SILVICULTURE

British Columbia's Forests:

Monocultures or Mixed Forests?

Province of
British Columbia
Ministry
of Forests

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Foreword

The Ministry of Forest's Research Branch and Regional ecologists have carried out an extensive correlation project of British Columbia's ecosystems over the past 5 years. The result of this correlation is the development of consistent nomenclature and description of similar ecosystem units throughout B.C.

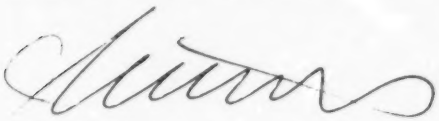
Over the past year, the Silviculture Interpretations Working Group (SIWG), Research Branch and regional ecologists have been reviewing the correlated ecosystem units. This group is using the correlated ecosystem descriptions, present knowledge of tree species reliability, ecological suitability and utility to develop correlated free-growing guidelines for tree species selection for all regions, biogeoclimatic subzones and ecosystems. Sites of similar ecological capability will have similar guidelines for tree species selection. The completed guidelines will be published in the winter of 1992/93.

In the development of tree species selection guidelines SIWG has been reviewing existing regional guidelines and philosophies for tree species selection. As part of the review, SIWG carried out a review of the types of new forests that had been created under past and existing reforestation guidelines and practices.

This report details the tree species composition of forests before harvesting and at the free-growing stage. The free-growing stage is normally 5 to 15 years after plantation or natural regeneration establishment and is normally when the new forest's tree species composition and density become stable and shaped for the future. To establish forests at the free-growing stage, about 51% of the harvested areas were planted and 49% were managed for natural regeneration. This report details the tree species composition of the plantations and naturally regenerated areas that eventually contributed to the tree species composition at the free-growing stage. The statistics in this report cover the period between 1970 and 1990, the period of British Columbia's history when the most harvesting and silviculture activity occurred.

The information in this report is being used to help determine what types of tree species selection guidelines and standards need to be developed to ensure that new Pre-Harvest Silviculture Prescriptions and reforestation practices will create new forests that are healthy, ecologically sound and biologically diverse.

For more information on this report or the activities of the Silviculture Interpretations Working Group, please contact the Silviculture Branch.



John Cuthbert
Chief Forester
British Columbia Forest Service

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Robin Brown	Silviculture Branch
Don Couch	ILMA
Ken Dowding	Vancouver Forest Region
Neil Endacott	Prince Rupert Forest Region
Tim Harding	CLMA
Gary McKellar	COFI
Ron Newman	Kamloops Forest Region
Bruce Pamplin	Prince George Forest Region
Bernie Peschke	Nelson Forest Region
Barry Penny	Cariboo Forest Region
Laird Pittman	ILMA
Dave Presslee	COFI-NILS
Dave Schwarz	CLMA
Ralph Winter	Silviculture Branch
Mike Wyeth	Silviculture Branch

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Table of Contents

Foreword iii

Acknowledgements iv

Introduction 1

British Columbia's Ecosystems 2

The Practice of Silviculture 3
- Harvesting 3
- Planting 4
- Natural regeneration 5
- Attaining free-growing status 5

Source of Information 6

Review of the Regional Tree Species Diversity 7
- British Columbia 7
- Cariboo 7
- Kamloops 7
- Nelson 7
- Prince George 8
- Prince Rupert 8
- Vancouver 8

Tree Species Diversity of British Columbia 9

Tree Species Diversity of the Cariboo Forest Region 10

Tree Species Diversity of the Kamloops Forest Region 11

Tree Species Diversity of the Nelson Forest Region 12

Tree Species Diversity of the Prince George Forest Region 13

Tree Species Diversity of the Prince Rupert Forest Region 14

Tree Species Diversity of the Vancouver Forest Region 15

Tree Species Composition of British Columbia 16
- Before harvest 16
- At the free-growing stage 17
- At planting 18
- After natural regeneration 19

Tree Species Composition of the Cariboo Forest Region 20
- Before harvest 20
- At the free-growing stage 21
- At planting 22
- After natural regeneration 23

Table of Contents

Tree Species Composition of the Kamloops Forest Region 24
- Before harvest 24
- At the free-growing stage 25
- At planting 26
- After natural regeneration 27

Tree Species Composition of the Nelson Forest Region 28
- Before harvest 28
- At the free-growing stage 29
- At planting 30
- After natural regeneration 31

Tree Species Composition of the Prince George Forest Region 32
- Before harvest 32
- At the free-growing stage 33
- At planting 34
- After natural regeneration 35

Tree Species Composition of the Prince Rupert Forest Region 36
- Before harvest 36
- At the free-growing stage 37
- At planting 38
- After natural regeneration 39

Tree Species Composition of the Vancouver Forest Region 40
- Before harvest 40
- At the free-growing stage 41
- At planting 42
- After natural regeneration 43

Appendix 1 – Tree Species and Biogeoclimatic Zone Codes 44

Introduction

Are British Columbia's forests being turned into large scale monocultures through harvesting and reforestation practices?

No! British Columbia's forests have generally maintained or increased their diversity of tree species after harvesting.

What is a forest monoculture?

A forest with only one coniferous or deciduous tree species growing in it.

What is a mixed forest?

A forest with more than one coniferous or deciduous tree species growing in it.

Why the concern about monoculture forests?

The types and numbers of tree species within a forest create unique ecosystems by affecting local climate and biological diversity.

Many people are concerned that forestry practices in British Columbia have increased the number of monoculture forests in the province, simplified forest ecosystems, and reduced biological diversity.

There is a widespread public perception that natural forests with a diversity of tree species are being harvested and replaced with genetically identical single species plantations. The concern is that this is resulting in ecosystems that have been simplified to the extent that they are unstable and unsustainable in the long run.

What is biological diversity?

Biological diversity refers to the types and amounts of flora and fauna in their natural surrounding. The fundamental principle behind preservation of biological diversity is that a diverse ecosystem provides a greater number of suitable habitats for many species. It also ensures higher resilience and resistance from pest and disease infestations, changing climatic conditions and catastrophic events.

This report describes the state of tree species diversity on logged areas and examines the effects of both natural and artificial regeneration on tree species diversity in all forest regions.

British Columbia's Ecosystems

British Columbia has diverse landscape, climate, soil and vegetation conditions. The landscape ranges from rolling hills in the Interior to steep mountainous terrain in the southeast and southwest portions of the province. Climate ranges from maritime to continental moisture regimes, and from Mediterranean to desert-like conditions. Soil types vary from sand to clay soils, with dark to light colours and deep to shallow organic layers. Vegetation types range from coastal rainforests to interior grasslands.

What determines the types of forests in British Columbia?

The combination of climate, soil, terrain, biological resources and successional differences have resulted in numerous distinct forest ecosystems in British Columbia. Within the 14 major forest ecosystem zones in the province are unique subzones and variants, and over 600 different ecosystem or site associations.

Each ecosystem is defined by particular moisture, nutritional and climatic conditions. Only trees that are adapted to these conditions will grow well in these ecosystems. Some species, however, are able to withstand greater environmental stress than others. In the Interior, for example, lodgepole pine has greater adaptability than white spruce in being able to survive frost and drought conditions.

Does nature create its own monocultures?

Yes. Twenty-nine percent of the forests harvested in British Columbia are natural monocultures of pine, fir, or spruce. For example, in the Interior Douglas-fir zone, 54% of the logged areas were monocultures before harvesting, made up predominantly of Douglas-fir or pine, species suited to this dry, hot zone. In the Boreal White and Black Spruce zone, 37% of the areas were monocultures of spruce, aspen or pine before harvesting, species characteristic of this dry, cool zone. In the Montane Spruce zone, 49% of the areas were monocultures of pine. Many of these forests were created by natural regeneration which followed catastrophic events such as wildfires, pest infestations and windthrow. In many of these areas, extreme environments including frost and drought have resulted in only one tree species being adapted to the site.

Harvesting

How does the Ministry of Forests ensure that healthy, ecologically suitable trees are established on harvested areas?

The *Forest Act* and Silviculture Regulation require that, before harvesting an area, forest companies or operators under the Small Business Enterprise Program prepare a comprehensive Pre-harvest Silviculture Prescription (PHSP). Foresters must first evaluate in detail the ecosystem proposed for logging. Then, using field guides for ecosystem identification and tree species selection, they must choose:

- the method to harvest the area;
- the method to reforest the area, whether through planting or natural regeneration;
- the preferred and acceptable tree species to make up the new forest;
- the target and minimum numbers of well-spaced trees to be established;
- time periods within which the area must be reforested; and
- time periods within which the trees must be free growing — free of competing vegetation and growth-inhibiting tree competition.

Before any harvesting occurs, the Ministry of Forests District Manager must approve the PHSP developed for any area. The District Manager must ensure that ecologically preferred and acceptable tree species are prescribed for the new forest.

Don't timber harvesters just plan to reforest areas with monocultures?

Timber harvesters normally propose that each area be restocked with three to five preferred and acceptable tree species. This gives them flexibility in their reforestation efforts and a greater ability to satisfactorily restock an area.

Province of British Columbia
Ministry of Forests

PRE-HARVEST SILVICULTURE PRESCRIPTION AGREEMENT (FINAL)

☑ ORIGINAL ☐ AMENDMENT ➤ _____

A legally binding agreement / amendment between the government of British Columbia and the tenure holder pursuant to B.C. Regulation 147 / 88. The pre-harvest silviculture prescription field data and initial prescription (FS 711 A & B), should provide the basis for this agreement.

TENURE

REGION	F.D.	LOCATION	T.S.A.	TSB	TIMBER MARK	BLOCK
K	4	Mudra Ck	22	F	A18632	1

LICENSEE	LICENCE NO.	C.P.	C/P MAP SHEET / OPENING NO.
Small Business Program	A18632	203	82L056 : : 38

GROSS AREA (ha)	PHOTO (LINE) NO (S)	FIELD WORK BY (Print)	DATE COMPLETED (Y M D)
35.0	BCC 453-41,42	John Mack	87 10 01

ECOLOGY

STRAT / PLOT #	AREA (ha)	ZONE	SUB	VAR / PH	SITE UNIT (E.A. / SER. SUB TYPE PH)	GRID TU LOC. (MN)	SUMMARY OF CRITICAL SITE FACTORS (Slope, aspect, humus / soil depth, texture, coarse fragments, etc.)
	35.0	ICH	MW	2	04	5C A	10%, S, moder, 50cm, SL, 50%

FREE GROWING STOCKING STANDARDS

TU	REGEN METH	AREA (ha)	SPECIES Pref	SPECIES Acc	WELL SPACED TREES Per HA TSS	WELL SPACED TREES Per HA MSS	WELL SPACED TREES Per HA Min Hor (m)	DELAY (yr)	FREE GROWING (yr) Early	FREE GROWING (yr) Late	TARGET MAX DENS. (s / ha)	LEADER GROW (cm)	CROP TREE SIZE VS. COMPET. (cm / %)
A	PLANT	35	Fdi Sxw	Lw Pl	1200	700	2.0	4	9	15	5000	25	150

ADMINISTRATION

PRESCRIPTION APPROVAL

MAXIMUM ALLOWABLE SITE DEGRADATION (Total = Spur Road + Skid Road + Landings + Firequards + Other)

Total 10 % = 5 % + 2 % + 2 % + 1 % + ?? ____ %

ATTACHMENTS: MAP YES ☑ NO ☐ — NO. OF PAGES 3

LICENSEE ACKNOWLEDGEMENT OF COMMITMENT UNDER SECTION 129.3, FOREST ACT — DATE SIGNED: 88 01 05

Bruce McKerr
R.P.F.'S SIGNATURE

Gerry Waring
GOVERNMENT APPROVAL (District Manager's Signature)

88 01 01
DATE SIGNED (Y M D)

Fred Hamer
DATE APPROVED: 88 01 12

FS 711C 2 SIL 895

Example of a PHSP form

Planting

How many tree species are planted in British Columbia?

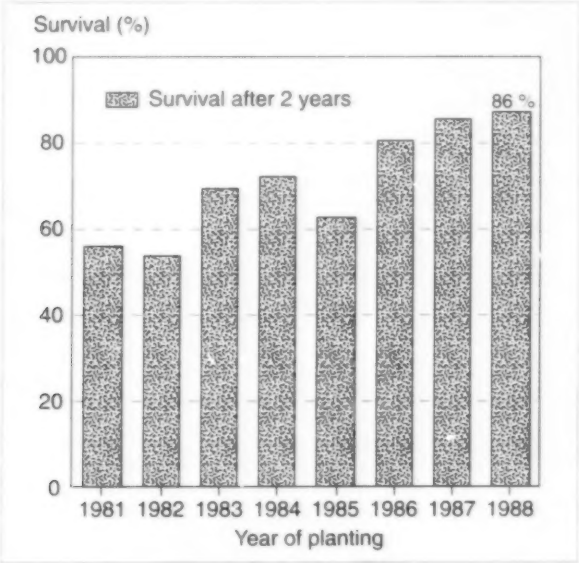
Nineteen different conifer and deciduous tree species and sub-species are planted annually in the province.

How many trees per hectare are generally planted?

Provincially, 1200 seedlings per hectare are planted, but this varies by ecosystem or site. Lower numbers of seedlings may be planted if natural regeneration is present or anticipated.

What is the survival of new plantations?

An 86% survival rate is typical on new plantations. As a result of improved forestry practices, this rate has increased from below 60% in 1981.



Average 2nd year seedling survival for trees planted in different years.

What percentage of plantations totally fail and need replanting?

Less than 10% of plantations totally fail and need replanting.

Are all new plantations genetically identical?

No. Most planted seedlings are produced from seed collected in the general vicinity of where the seedlings are planted. The Ministry of Forests Seed Centre has over 3600 different seedlots with which to reforest ecosystems.

Even with 10% of seedlings produced from seeds from seed orchards, the individual trees have genetic variability and are not genetically identical clones.

Why are 65% of the plantations, established between 1970 and 1990, monocultures?

Foresters usually focus on planting the preferred tree species for an ecosystem, with the knowledge that natural regeneration will provide other acceptable tree species to the site. When determining the types and how many preferred trees to plant on an ecosystem, the forester takes into account the ingrowth of acceptable natural regeneration. In the last two decades, silviculture surveys have shown that for every 1200 trees planted per hectare, nature adds another 1000 to 2000.

Natural regeneration

What percentage of harvested areas are naturally regenerated?

About 49% of harvested areas are actively managed for natural regeneration; the other 51% are planted.

Do naturally regenerated areas have more tree species diversity than planted areas?

Only 22% of young, naturally regenerated stands are monocultures, compared to 65% of young planted areas. However, 5–15 years after establishment, natural regeneration on planted areas adds a variety of other tree species. At this time, only 29% of all new forests are monocultures; the other 71% are a mixture of tree species.

Why isn't natural regeneration used to reforest all harvested areas?

Many areas are harvested to salvage trees killed through wildfire, pest infestation, windthrow or other catastrophic events. Where large wildfires have destroyed all seed sources for natural regeneration, planting is required to reforest the area. In areas that have experienced severe root rot, mountain pine beetle or budworm infestations, foresters prescribe tree species less susceptible to pests than the original species.

It often takes 7–15 years before natural regeneration establishes on a harvested site. Natural regeneration depends on nearby seed sources, a good seedbed and a good cone production year. For some tree species, good cone and seed production occurs only every 7–12 years.

On moist ecosystems, competing brush growth occurs almost immediately after harvest and the process of natural regeneration would take many decades to occur. To ensure new forests establish successfully on these brush prone areas, plantations must be established within months of harvesting and site preparation. Most are established no later than 4 years after the start of harvesting.

Attaining free-growing status

Before harvesting can begin in an area, the PHSP must be signed and sealed by a professional forester. The prescription requires timber harvesters to establish healthy new forests, with ecologically suitable tree species at correct densities, free from deleterious brush and tree competition, within specific time periods. Stands that have met all these conditions are called free growing.

What incentive is there for timber harvesters to maintain or increase the tree species diversity?

Only those trees that the timber harvesters have identified in the PHSP as preferred and acceptable tree species (typically three to five) for the new forest can be counted towards stocking a site. The more species timber harvesters manage through planting and natural regeneration, the easier it is for them to ensure that an area becomes "satisfactorily restocked." The quicker that timber harvesters establish a satisfactorily restocked forest, free from brush, the sooner they can be relieved of their basic silviculture obligations to the ministry.

Why are free-growing forests so important?

The law requires timber harvesters to establish free-growing forests of ecologically suited tree species within 7–15 years after harvesting has begun. During this period, the forest's tree species composition and density become stable and shaped for the future.

Are today's new forests less diverse than those originally harvested?

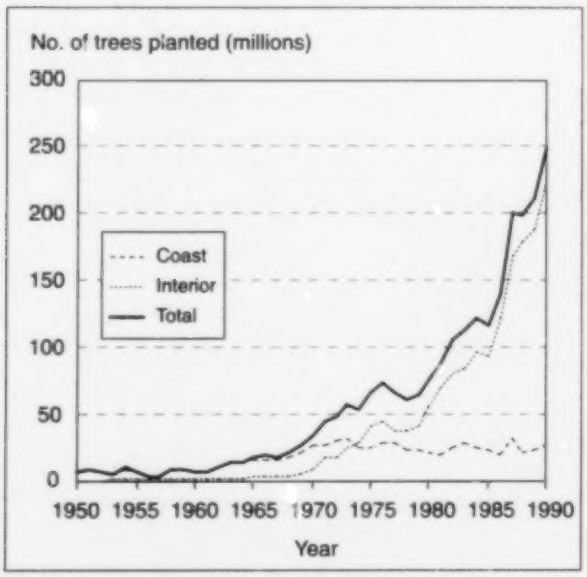
No. Twenty-nine percent of new forests in the free-growing stage are monocultures of spruce, pine and fir — the same proportion as before harvest. However, the concentration of the monocultures is not evenly distributed throughout British Columbia. At the free-growing stage throughout B.C., the diversity of tree species types or combinations is as great or greater than the diversity that was present prior to harvesting.

Where does this information on tree species diversity come from?

The information used for this study comes from the Ministry of Forests' History Record of Crop Establishment and Stand Tending computer system. This database records detailed harvesting and silviculture information on about 70 000 cutblocks covering 5 million hectares and all major ecosystems. The information in the database is provided by ministry and forest company surveys on Timber Supply Areas. At present, the ministry's History Record system only records the three most predominant tree species in each ecosystem.

What time period is covered by the information provided?

The statistics in this report cover the period between 1970 and 1990, the period of British Columbia's history when the most harvesting and silvicultural activity occurred.



Number of trees planted each year in British Columbia (planting on all tenures).

How do I interpret the graphs and statistical tables in this report?

All the statistics are based on actual hectares harvested, planted, naturally regenerated and at free growing. To portray the information in an easily interpreted manner, all statistics were converted into percentages and then weighted by area. Some of the columns in the statistical tables may not add up because of rounding of numbers.

The terminology used in the graphs and summary tables are as follows:

- Monoculture – an area or cutblock where there was only one main tree species tallied in the field surveys.
- Mixed forest – an area or cutblock where there are two or more different tree species tallied in the field surveys.
- Coniferous monocultures – the percent of forests in a region or biogeoclimatic zone (ecosystem) that have only one main coniferous tree species observed in the field surveys (i.e. interior Douglas-fir – Fdi).
- Deciduous monocultures – the percent of forests in a region or ecosystem that have only one deciduous tree species tallied in the field surveys (i.e. Aspen – At).
- Coniferous mixed forests – the percent of forests in a region or ecosystem that have a conifer as a leading tree species but also have one or more coniferous or deciduous tree species tallied in the field surveys (i.e. interior Douglas-fir and lodgepole pine – Fdi Pli).
- Deciduous mixed forests – the percent of forests in a region or ecosystem that have a deciduous tree as a leading tree species but also have one or more coniferous or deciduous tree species tallied in the field surveys (i.e. Aspen and white spruce – At Sw).

Twenty-one different commercial tree species were observed in field surveys throughout B.C. and reported in this document. Surveys have found a wide variety of tree species combinations covering cutblocks throughout B.C. Because there are so many combinations of tree species occurring on different cutblocks, the summary tables have the main two tree species types and tree species combinations that make up 1% or more of the regional forest types. All other combinations are summarized as "Other".

Are there any limitations to the information provided?

The information presents general trends. Although the time periods and different stages or activities are not directly related they give a general indication of whether the tree species composition has shifted and whether there was an increase or decrease of "monocultures." To keep this report concise, this document only presents information on whether there is one species or two or more species present for a given ecosystem. All of British Columbia's forest regions have ecosystems on which surveys are recording 5 to 7 different trees species present.

The following graphs detail the tree species composition of the provincial and regional forests at varying time periods.

For more information, contact the Ministry of Forests, Silviculture Branch.

Review of the Regional Tree Species Diversity

British Columbia

British Columbia experiences a wide variety of climates, with maritime to continental conditions, very dry to very wet moisture regimes, and hot to very cold temperature ranges. The 14 major ecological zones in the province contain more than 600 different ecosystem associations.

Before harvesting occurred, 32% of the forest stands were monocultures of spruce, pine, fir or aspen. The remaining 68% were mixed forests stands of spruce, pine, fir, hemlock, cedar, balsam and aspen. After harvesting, 65% of the forests were replanted with single species of spruce, pine or fir, and the remaining 35% with a mixture of species. Of the forests managed for natural regeneration, only 22% regenerated as monocultures; the other 78% contained mixed forests. Five to 15 years after planting and natural regeneration, only 29% of all forests consisted of monoculture stands of pine, spruce or fir. The remaining 71% contained mixed forests of pine, spruce, fir, hemlock, cedar, balsam, and aspen.

In the province overall, the newly regenerated forests have, through natural and artificial regeneration, maintained the same level of tree species diversity that was present before harvesting.

Cariboo

The Cariboo Forest Region is located in the central portion of British Columbia. It is characterized by very dry to wet moisture regimes and warm to cold temperature ranges. The major forest ecosystems in this region are the Engelmann Spruce-Subalpine Fir, Interior Cedar-Hemlock, Interior Douglas-fir, Montane Spruce, and Sub-Boreal Pine-Spruce zones.

Before harvesting occurred, 63% of the forests were monocultures of fir, pine or spruce, and 37% were mixed forests of fir, pine, spruce and balsam. After harvesting, 60% of the forests planted were monocultures of spruce, pine or fir; 40% were combinations of spruce, pine and fir. Thirty-seven percent of the forests that naturally regenerated resulted in monocultures of pine or fir; the remaining 63% were mixes of pine, fir, spruce and aspen. Five to 15 years after re-establishment, 36% of the forests were monoculture forests of pine, fir or spruce; the other 64% were mixed forests of fir, pine, spruce, balsam and aspen.

The Cariboo Forest Region has exhibited significant decreases in the proportion of monoculture forests since harvesting. Natural and artificial regeneration strategies have resulted in forests with greater tree species diversity.

Kamloops

The Kamloops Forest Region is located in the south-central portion of British Columbia. It is characterized by very dry to wet moisture regimes and hot to cool temperature ranges. The major forest ecosystems in this region are the Engelmann Spruce-Subalpine Fir, Interior Cedar-Hemlock, Interior Douglas-fir, Montane Spruce, and Ponderosa Pine zones.

Before harvesting occurred, 43% of the forests were monocultures of fir, pine or spruce. The remaining 57% were mixed coniferous forests of fir, pine, spruce and balsam. After harvesting, 77% of the forests planted were monocultures of spruce, pine or fir; the other 23% were mixed conifers of pine, spruce and fir. Of the forests that naturally regenerated, 17% were monocultures of pine or fir, and 83% were mixtures of pine, fir, spruce, hemlock, cedar and aspen. At 5 to 15 years old, 35% of the forests remained as monoculture stands of fir, pine or spruce; the other 65% became mixed stands of fir, pine, spruce, balsam and aspen.

The Kamloops Forest Region has maintained, after harvesting, the same level of diversity through natural and artificial regeneration. Five to 15 years after re-establishment, the new forests had higher levels of species diversity than prior to harvest.

Nelson

The Nelson Forest Region is located in the southeastern portion of British Columbia. It is characterized by very dry to wet moisture regimes and warm to cool temperature ranges. The major forest ecosystems in this region are the Engelmann Spruce-Subalpine Fir, Interior Cedar-Hemlock, Interior Douglas-fir, and Montane Spruce zones.

Before harvesting occurred, 19% of the forests were monocultures consisting mostly of pine. The remaining 81% were composed of mixed coniferous forests of pine, fir, cedar, hemlock and spruce. After harvesting, 70% of the planted forests were monocultures of spruce, pine, or fir; the other 30% were mixed coniferous stands of fir, pine and spruce. Of the forests that regenerated naturally, 17% of the stands were monocultures of pine or fir; 83% were mixed compositions of fir, pine, spruce and other species. Five to 15 years later, 22% of the forests were monocultures of spruce, pine or fir, and the remaining 78% were mixed stands of spruce, pine, fir, balsam, hemlock and cedar.

The Nelson Forest Region did not have significant changes in diversity before and after harvesting. The diversity of the new forests has been maintained through natural regeneration.

Review of the Regional Tree Species Diversity

Prince George

The Prince George Forest Region is located in the northeastern portion of British Columbia. It is characterized by moist to wet moisture regimes and cool to cold temperature ranges. The major forest ecosystems in the region are Boreal White and Black Spruce, Engelmann Spruce-Subalpine Fir, Interior Cedar-Hemlock, and Sub-Boreal Spruce zones.

Before harvesting occurred, 35% of the forests were monocultures of pine, spruce or aspen. The remaining 65% of the forests consisted of mixtures of pine, spruce, fir and aspen. After harvesting, 72% of the forests planted were monocultures of spruce or pine, and the other 28% contained mixed forests stands of spruce, pine and fir. Twenty-three percent of the forests that regenerated naturally were monocultures consisting mainly of pine; the remaining 77% were mixed coniferous and deciduous forests of pine, spruce, balsam and aspen. Five to 15 years after re-establishment, 37% of the forests remained as monocultures of spruce, pine or aspen, and 63% became mixed stands of spruce, pine, balsam and aspen.

The Prince George Forest Region has not exhibited any significant increase in the proportion of monoculture stands since before harvesting. Diversity has been maintained through natural regeneration.

Prince Rupert

The Prince Rupert Forest Region is located in the northwestern portion of British Columbia. It is characterized by moist to very wet moisture regimes and cool to cold temperature ranges. The major forest ecosystems in this region are the Boreal White and Black Spruce, Coastal Western Hemlock, Interior Cedar-Hemlock, and Sub-Boreal Spruce zones.

Before harvesting occurred, 19% of the forests were mainly monocultures of pine or spruce. The remaining 81% were mixed stands of pine, spruce, hemlock and balsam. After harvesting, 46% of the forests planted were monocultures of spruce or pine, and the other 54% were mixed coniferous stands of pine, spruce and hemlock. Twenty-five percent of the forests that regenerated naturally resulted in monocultures predominantly of pine; 75% re-established as mixed coniferous forest stands of pine, spruce, hemlock and balsam. Five to 15 years after re-establishment, 31% of the forests were monocultures of pine or spruce, and 69% were mixed stands of pine, spruce, hemlock, balsam and aspen.

The Prince Rupert Forest Region has had an increase in the proportion of forests that are monocultures. This region is now reviewing its harvesting and regeneration standards to increase the quantity of mixed forests.

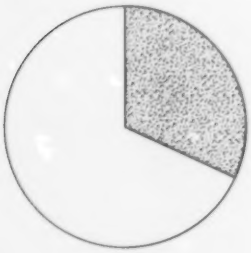
Vancouver

The Vancouver Forest Region is located in the southwestern portion of the province. It is characterized by moist to very wet moisture regimes and warm to cool temperature ranges. The major forest ecosystems in this region are the Coastal Douglas-fir, Coastal Western Hemlock, and Mountain Hemlock zones.

Before harvesting occurred, 6% of the forests were made up predominantly of fir. The remaining 94% of the forests were made up of mixed stands of hemlock, cedar, fir, balsam and spruce. After harvesting, 54% of the forests were planted with monocultures of fir, hemlock, cedar or spruce, and 46% with mixed coniferous stands of fir, hemlock, cedar, balsam and spruce. The forests that naturally regenerated resulted again in 6% of monocultures, mostly of fir, and 94% of mixed stands of hemlock, cedar, fir and balsam. Five to 15 years after harvesting, 10% of forests were monocultures, predominantly fir, and 90% were mixed stands of hemlock, cedar, fir, spruce, balsam and alder.

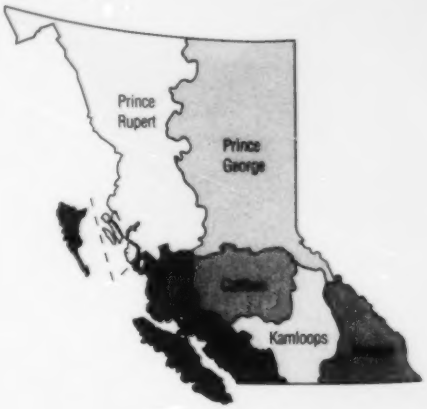
The Vancouver Forest Region maintained relatively similar levels of diversity as a result of natural regeneration.

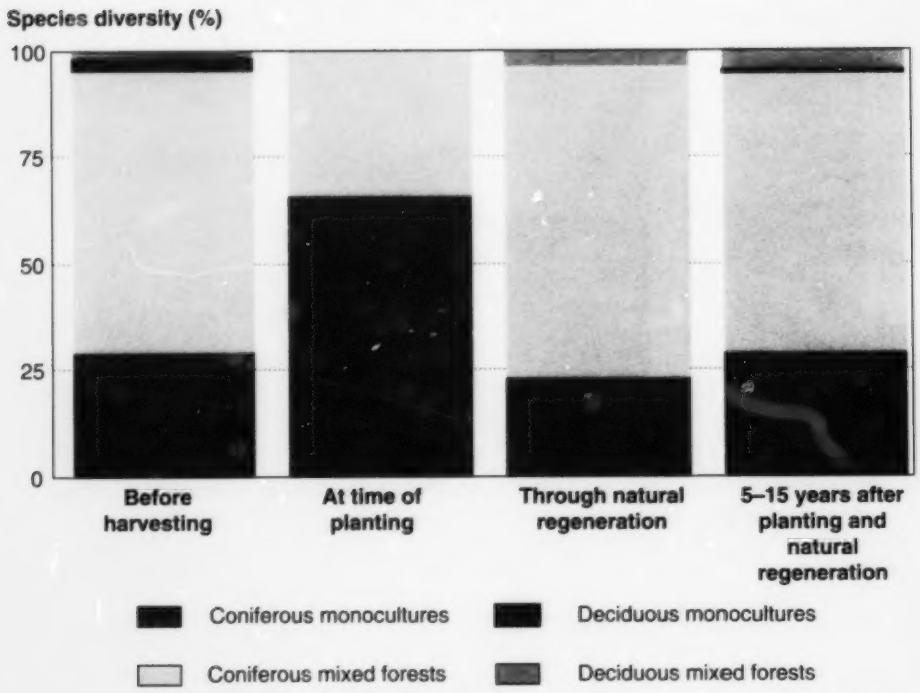
Tree Species Diversity of British Columbia



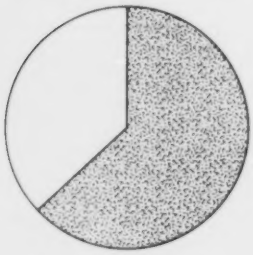
32% of forests are monocultures before harvesting

29% of new forests are monocultures 5–15 years after harvesting

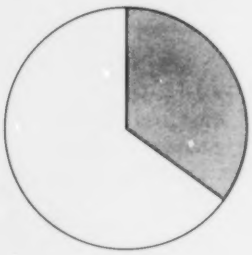




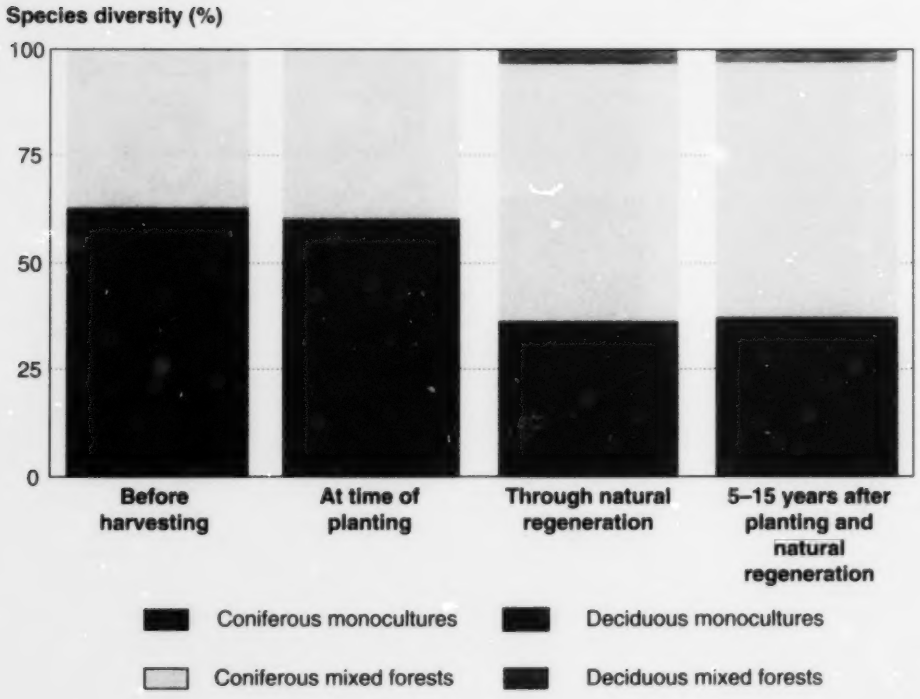
Tree Species Diversity of the Cariboo Forest Region



63% of forests are monocultures before harvesting

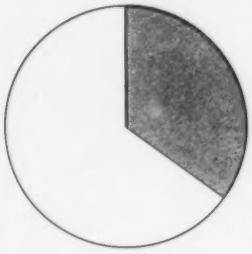


36% of new forests are monocultures 5–15 years after harvesting

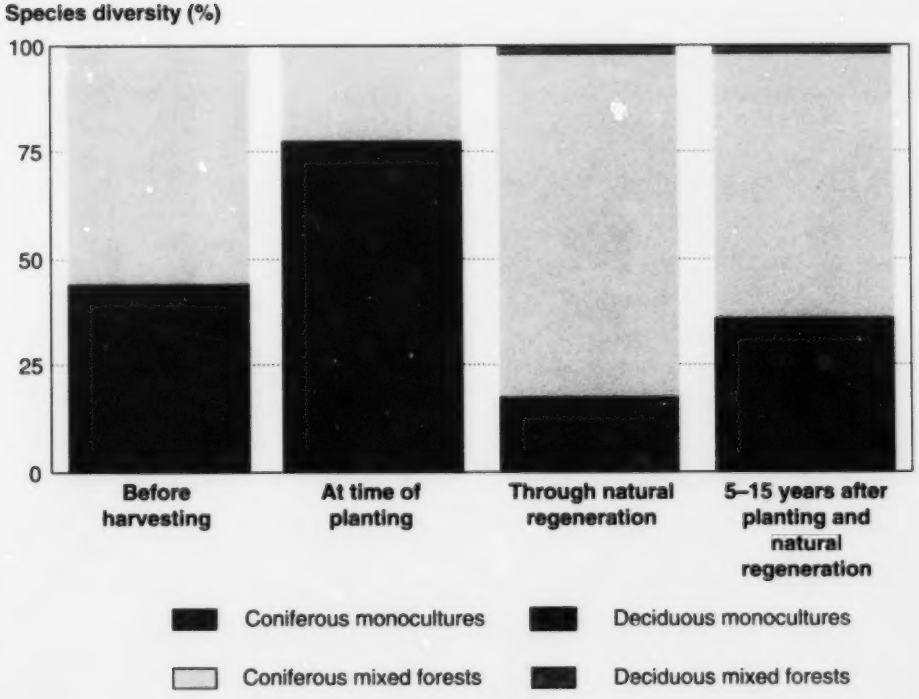


Tree Species Diversity of the Kamloops Forest Region

43% of forests are monocultures before harvesting



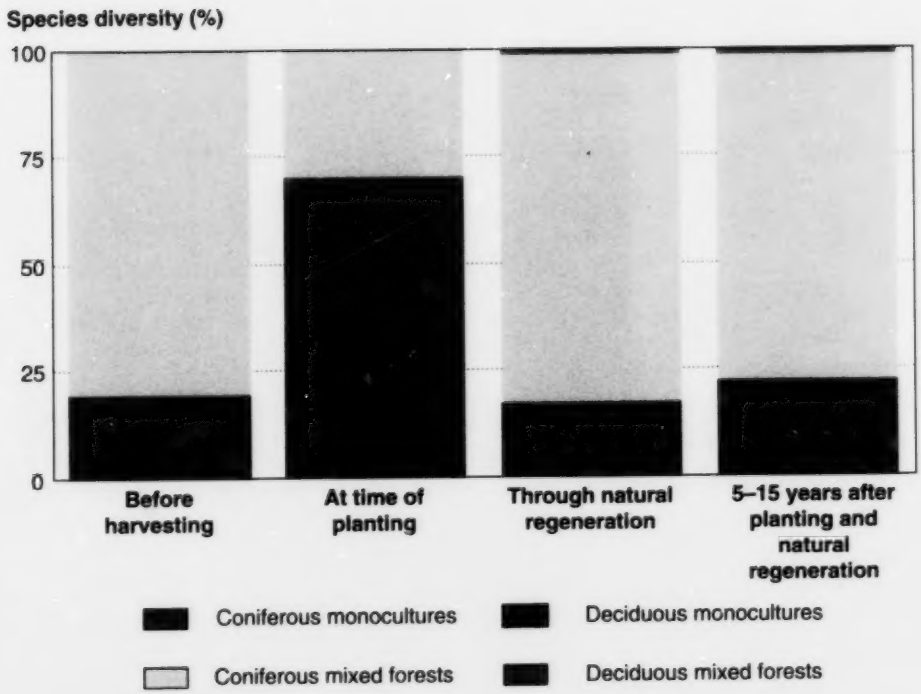
35% of new forests are monocultures 5–15 years after harvesting



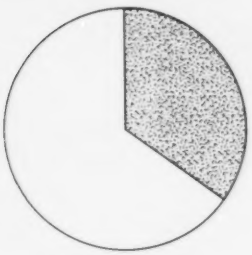
Tree Species Diversity of the Nelson Forest Region

19% of forests are monocultures before harvesting

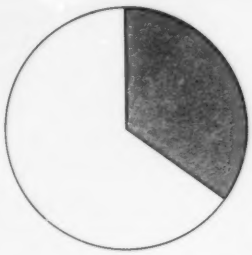
22% of new forests are monocultures 5–15 years after harvesting



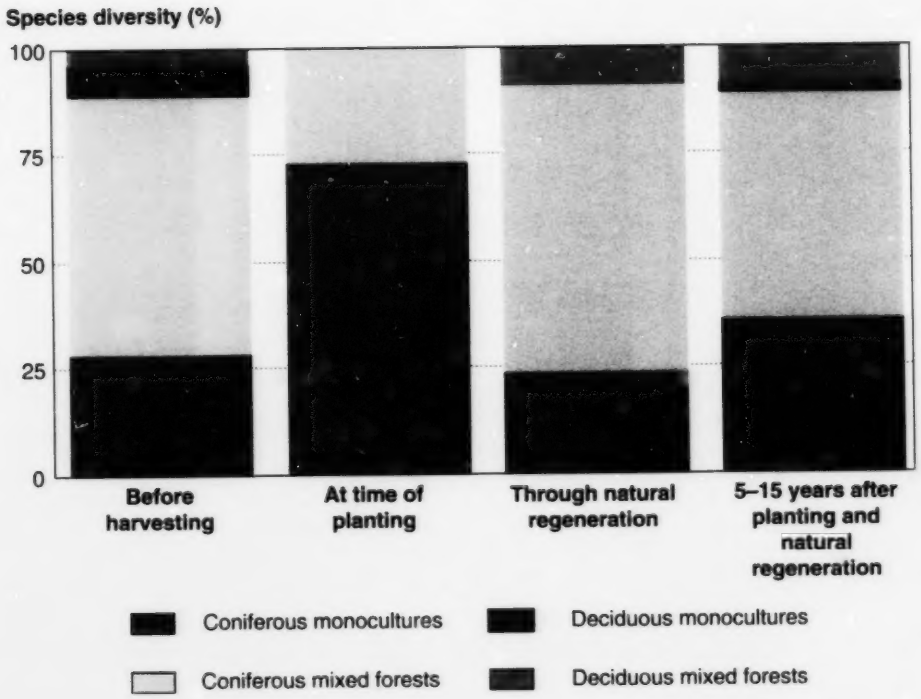
Tree Species Diversity of the Prince George Forest Region



35% of forests are monocultures before harvesting

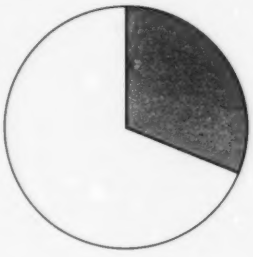


37% of new forests are monocultures 5–15 years after harvesting

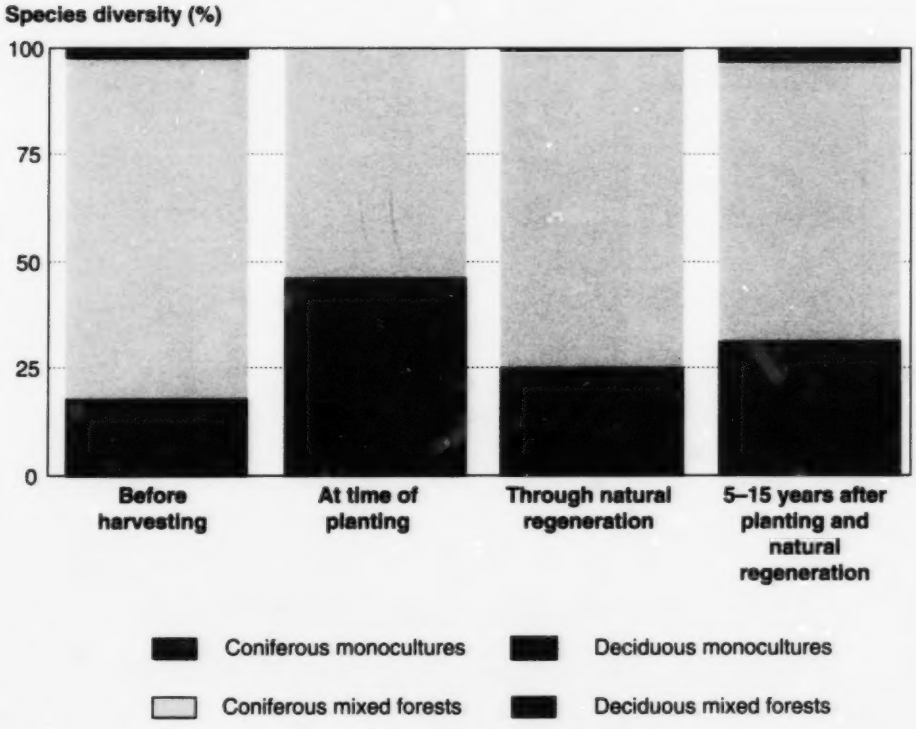


Tree Species Diversity of the Prince Rupert Forest Region

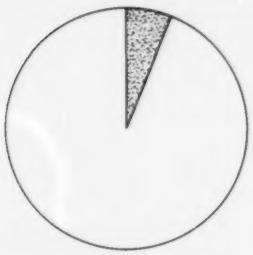
19% of forests are monocultures before harvesting



31% of new forests are monocultures 5–15 years after harvesting

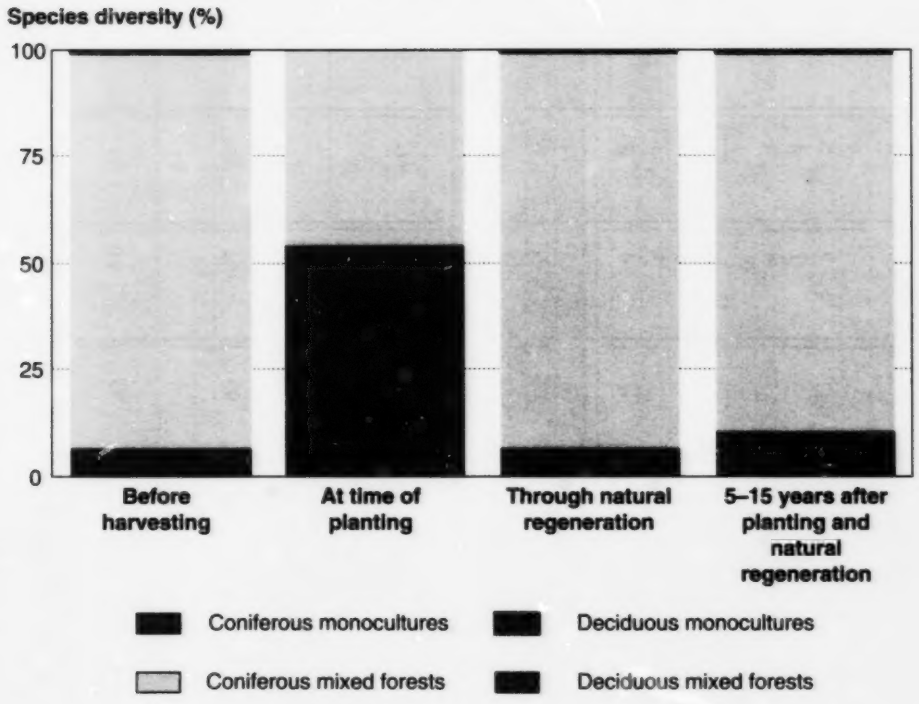


Tree Species Diversity of the Vancouver Forest Region



6% of forests are monocultures before harvesting

10% of new forests are monocultures 5–15 years after harvesting



Species Type[a]	Biogeoclimatic Zone										British Columbia %
	BWBS %	CDF %	CWH %	ESSF %	ICH %	IDF %	MH %	MS %	PP %	SBS %	
At	20				2	34		2	21		3
Fdi					4	13		5		1	5
Fdi Pli					6	19		46	2	20	3
Pli	10			9	4	10		8	1	1	16
Pli Fdi				1	4			2		42	3
Pli Sx	2			4	1			3			18
Se Bl				19						5	2
Sw	21			1						10	3
Sx	5			7	1					14	5
Sx Bl	1			4	2						7
Sx Pli	7										
Subtotal	**66**			**45**	**24**	**76**		**66**	**24**	**93**	**68**
Other[b]	**34**	**100**	**100**	**55**	**76**	**24**	**100**	**34**	**76**	**7**	**32**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Coniferous Monocultures	37	23	5	16	16	54	5	49	23	25	29
Deciduous Monocultures	21		1								3
Monocultures Subtotal	**58**	**23**	**6**	**16**	**16**	**54**	**5**	**49**	**23**	**25**	**32**
Coniferous Mixed Forests	32	72	93	84	83	46	95	51	77	74	67
Deciduous Mixed Forests	10	5	1		1					1	1
Mixed Forests Subtotal	**42**	**77**	**94**	**84**	**84**	**46**	**95**	**51**	**77**	**75**	**68**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Species Type[a]	Biogeoclimatic Zone										British Columbia %
	BWBS %	CDF %	CWH %	ESSF %	ICH %	IDF %	MH %	MS %	PP %	SBS %	
Bl Se				18	2			2			3
Fdi					5	26		3	5	1	4
Fdi Pli				1	3	24		4		1	4
Hw Ba			17				3				3
Hw Cw		1	14		4		1				3
Pli	11			8	6	12		26	5	22	13
Pli At	3				1	5		3		6	3
Pli Bl	1			4	1	1		11		3	2
Pli Fdi				1	3	9		5		1	2
Pli Sx	5			2	3	1		3		15	6
Se			1	12	5		6	4			3
Se Bl				14	2		1	2			2
Sx	1			8	5					12	6
Sx Bl				4	2					5	2
Sx Pli	2			2	3					7	3
Sw	19			1						2	2
Subtotal	**42**	**1**	**32**	**75**	**45**	**78**	**11**	**63**	**10**	**75**	**61**
Other[b]	**58**	**99**	**68**	**25**	**55**	**22**	**89**	**37**	**90**	**25**	**39**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Coniferous Monocultures	30	18	9	32	22	40	13	33	10	36	29
Deciduous Monocultures	9										
Monocultures Subtotal	**39**	**18**	**9**	**32**	**22**	**40**	**13**	**33**	**10**	**36**	**29**
Coniferous Mixed Forests	44	80	89	67	73	58	85	64	90	57	66
Deciduous Mixed Forests	17	2	2	1	5	2	2	3		7	5
Mixed Forests Subtotal	**61**	**82**	**91**	**68**	**78**	**60**	**87**	**67**	**90**	**64**	**71**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

[a,b] See previous page for footnotes.

Species Type[a]	Biogeoclimatic Zone										British Columbia %
	BWBS %	CDF %	CWH %	ESSF %	ICH %	IDF %	MH %	MS %	PP %	SBS %	
Fdc		34	28		1		9				4
Fdi				1	14	29		7		1	4
Fdc Cw		33	10								1
Pli	1			12	10	30		40	100	17	13
Pli Se				6	2	3		11			2
Pli Sx	1			3	6	1		1		16	8
Se			5	44	17	6	49	18			12
Sx	13		2	18	16	1				39	23
Sx Pli	1			5	6					13	7
Sw	74			2	1					5	7
Sw Pli	7									2	1
Subtotal	**97**	**67**	**45**	**91**	**73**	**70**	**58**	**77**	**100**	**93**	**82**
Other[b]	**3**	**33**	**55**	**9**	**27**	**30**	**42**	**23**		**7**	**18**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Coniferous Monocultures	87	37	52	77	62	69	75	66	100	62	65
Deciduous Monocultures											
Monocultures Subtotal	**87**	**37**	**52**	**77**	**62**	**69**	**75**	**66**	**100**	**62**	**65**
Coniferous Mixed Forests	13	63	48	23	38	31	25	34		38	35
Deciduous Mixed Forests											
Mixed Forests Subtotal	**13**	**63**	**48**	**23**	**38**	**31**	**25**	**34**		**38**	**35**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Species Type[a]	Biogeoclimatic Zone										British Columbia %
	BWBS %	CDF %	CWH %	ESSF %	ICH %	IDF %	MH %	MS %	PP %	SBS %	
Ba Hw			16				35				3
Bl Se				33	4			3			5
Fdi					2	17		4	13	1	5
Fdi Pli				1	3	30		5		2	8
Hw Ba			27				4				4
Hw Cw		4	18		9		1				4
Pli	23			8	3	13		24		29	14
Pli At	6			1	1	6		4		12	5
Pli Bl	2			6	2	1		12		5	3
Pli Fdi				2	4	10		5		3	4
Pli Se	8			3	2			10			2
Pli Sx	12			1	1	1		5		19	6
Se Bl				13	3			1			2
Subtotal	**51**	**4**	**61**	**68**	**34**	**78**	**40**	**73**	**13**	**71**	**65**
Other[b]	**49**	**96**	**39**	**32**	**66**	**22**	**60**	**27**	**87**	**29**	**35**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	100

Coniferous Monocultures	27	17	5	15	9	32	8	30	13	32	22
Deciduous Monocultures											
Monocultures Subtotal	**27**	**17**	**5**	**15**	**9**	**32**	**8**	**30**	**13**	**32**	**22**
Coniferous Mixed Forests	59	79	95	84	87	67	92	67	87	62	74
Deciduous Mixed Forests	14	4		1	4	1		3		6	4
Mixed Forests Subtotal	**73**	**83**	**95**	**85**	**91**	**68**	**92**	**70**	**87**	**68**	**78**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

[a,b] See previous page for footnotes.

Tree Species Composition of the Cariboo Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone					Cariboo Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
At Ep					1	
Cw	1	13				1
Cw Sx	1	6				
Fdi		1	22		1	8
Fdi Pli		8	21		5	10
Fdi Sx		5			1	1
Pli	5	1	44	79	65	51
Pli Fdi	1	6	11		5	7
Pli Sx	13	10		18	8	7
Sx	11	3			4	3
Sx Bl	46	17			2	5
Sx Cw		4				
Sx Fdi	3	4			1	1
Sx Pli	18	13		3	5	5
Subtotal	**99**	**91**	**98**	**100**	**98**	**99**
Other[b]	**1**	**9**	**2**		**2**	**1**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	17	17	66	79	71	63
Deciduous Monocultures						
Monocultures Subtotal	**17**	**17**	**66**	**79**	**71**	**63**
Coniferous Mixed Forests	83	83	34	21	28	37
Deciduous Mixed Forests					1	
Mixed Forests Subtotal	**83**	**83**	**34**	**21**	**29**	**37**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Cariboo Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone					Cariboo Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
At Pli			2		2	1
At Sx					1	1
Bl Sx	3	3			1	1
Fdi		4	22		3	10
Fdi At			3		1	1
Fdi Pli	2	4	34		4	15
Fdi Sx	1	6	1		3	2
Pli	12	5	17	44	26	20
Pli At	2		8	1	11	8
Pli Bl	1	2		1	3	2
Pli Fdi		4	10		5	6
Pli Sx	16	8	1	49	14	10
Sx	26	17		1	3	6
Sx Ac	1	3			2	1
Sx Bl	14	6			5	4
Sx Fdi		8			1	1
Sx Pli	15	8		1	7	5
Subtotal	**93**	**78**	**98**	**97**	**92**	**94**
Other[b]	**7**	**22**	**2**	**3**	**8**	**6**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	39	28	39	46	33	36
Deciduous Monocultures						
Monocultures Subtotal	**39**	**28**	**39**	**46**	**33**	**36**
Coniferous Mixed Forests	61	68	59	54	62	61
Deciduous Mixed Forests		3	2		5	3
Mixed Forests Subtotal	**61**	**72**	**61**	**54**	**67**	**64**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Cariboo Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone					Cariboo Region %
	ESSF	ICH %	IDF %	MS %	SBS %	
Fdi		7	12		3	4
Fdi Pli	1	4	5		3	3
Fdi Sx	1	9			4	4
Pli	8	5	54	68	16	14
Pli Fdi	1	2	12		2	2
Pli Sx	14	8	5	23	11	11
Se		3			1	1
Sx	48	40	6	1	41	41
Sx Fdi	3	11			4	5
Sx Pli	23	9	3	8	14	14
Subtotal	**99**	**98**	**97**	**100**	**99**	**99**
Other[b]	**1**	**2**	**3**		**1**	**1**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	57	55	73	69	62	60
Deciduous Monocultures						
Monocultures Subtotal	**57**	**55**	**73**	**69**	**62**	**60**
Coniferous Mixed Forests	43	45	27	31	38	40
Deciduous Mixed Forests						
Mixed Forests Subtotal	**43**	**45**	**27**	**31**	**38**	**40**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Cariboo Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone					Cariboo Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
At Ac					1	
At Fdi			1			
At Pli	2		1		2	2
At Sx					1	
Bl Pli	1	3			1	
Bl Sx	17	7			1	2
Fdi		1	23		3	13
Fdi At			3		1	2
Fdi Bl		2			1	
Fdi Pli		8	35		4	20
Fdi Sx		6	1		3	2
Pli	28	5	16	39	32	24
Pli At	13	2	8	1	16	11
Pli Bl	2	7			4	2
Pli Fdi	1	1	10		6	8
Pli Sx	9	5	1	56	16	9
Sx	4	4				
Sx Bl	3	10				
Sx Fdi		7			1	1
Sx Pli	3	1			2	1
Subtotal	**83**	**69**	**99**	**96**	**95**	**97**
Other[b]	**17**	**31**	**1**	**4**	**5**	**3**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	40	12	39	39	37	37
Deciduous Monocultures						
Monocultures Subtotal	**40**	**12**	**39**	**39**	**37**	**37**
Coniferous Mixed Forests	57	83	59	61	58	60
Deciduous Mixed Forests	3	5	2		5	3
Mixed Forests Subtotal	**60**	**88**	**61**	**61**	**63**	**63**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Kamloops Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone					Kamloops Region %
	ESSF %	ICH %	IDF %	MS %	PP %	
Bl Se	10	2				3
Fdi		5	48	2	21	18
Fdi Cw		8	1			1
Fdi Lw		4	2	1	2	1
Fdi Pli		8	11	4		6
Fdi Py			4		61	2
Fdi Se	1	3	3	1		2
Lw Fdi		1	1	1		1
Pli	10	8	13	49	2	21
Pli Fdi		8	9	6	1	6
Pli Lw		3	1	5		2
Pli Se	9	4	1	15		7
Py Fdi	1		2		12	1
Se	7	3		1		3
Se Ba	3					1
Se Bl	42	4		5		12
Se Fdi	1			1		1
Se Pli	9	2		5		4
Subtotal	**93**	**63**	**96**	**96**	**99**	**92**
Other[b]	**7**	**37**	**4**	**4**	**1**	**8**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	18	20	61	51	23	43
Deciduous Monocultures						
Monocultures Subtotal	**18**	**20**	**61**	**51**	**23**	**43**
Coniferous Mixed Forests	82	80	39	49	77	57
Deciduous Mixed Forests						
Mixed Forests Subtotal	**82**	**80**	**39**	**49**	**77**	**57**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Kamloops Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone					Kamloops Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
Bl Pli	4			2	6	2
Bl Se	24	2		2	16	8
Cw Fdi		2	1			1
Cw Hw		6				2
Fdi		9	31	1	1	12
Fdi Cw		2	1			1
Fdi Pli		3	15	1	1	6
Fdi Py			3			1
Fdi Se		1	3	1		2
Hw Cw		5				2
Pli	8	5	9	16	14	12
Pli At			1	2	2	1
Pli Bl	5	1	1	10	8	5
Pli Fdi		2	7	3	1	4
Pli Se	5	1	1	9	7	5
Se	19	8	1	3	17	9
Se Bl	17	2		1	6	6
Se Cw		3				1
Se Pli	3	1	1	3	3	2
Subtotal	**85**	**53**	**75**	**54**	**82**	**82**
Other[b]	**15**	**47**	**25**	**46**	**18**	**18**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	31	27	47	33	36	35
Deciduous Monocultures						
Monocultures Subtotal	**31**	**27**	**47**	**33**	**36**	**35**
Coniferous Mixed Forests	68	65	51	64	64	62
Deciduous Mixed Forests	1	8	2	3		3
Mixed Forests Subtotal	**69**	**73**	**53**	**67**	**64**	**65**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Kamloops Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone					Kamloops Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
Fdi		25	31	4	2	11
Fdi Pli		6	10	2		3
Fdi Se		4	3	1		2
Pli	16	15	26	42	31	22
Pli Fdi		3	7	2	2	2
Pli Se	9	2	4	14	17	7
Se	65	33	6	22	39	43
Se Fdi		4	1	1	3	1
Se Pli	7	3	1	8	6	5
Subtotal	**97**	**95**	**89**	**96**	**100**	**96**
Other[b]	**3**	**5**	**11**	**4**		**4**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	83	75	69	69	72	77
Deciduous Monocultures						
Monocultures Subtotal	**83**	**75**	**69**	**69**	**72**	**77**
Coniferous Mixed Forests	17	25	31	31	28	23
Deciduous Mixed Forests						
Mixed Forests Subtotal	**17**	**25**	**31**	**31**	**28**	**23**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Kamloops Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone					Kamloops Region %
	ESSF %	ICH %	IDF %	MS %	SBS %	
Bl	6	1		1	7	2
Bl Pli	6	1		5	9	3
Bl Se	43	5	1	4	27	14
Bl Sx	4	1			8	1
Cw Bl		5				1
Cw Fdi		6	2			2
Cw Hw		13				2
Fdi		3	2		1	1
Fdi Cw		3	3	1		2
Fdi Pli		1	29	3	1	10
Fdi Py			6			2
Fdi Se		2	9	1		3
Hw Cw		12				2
Pli	4	3	13	26	10	13
Pli At			2	4		2
Pli Bl	6	1	2	20	10	7
Pli Fdi		1	11	6		5
Pli Lw		1	1	2		1
Pli Se	3	1	1	13	4	4
Se Bl	13	3		1	5	4
Se Pli	1	1	1	2		1
Subtotal	**86**	**64**	**83**	**89**	**82**	**82**
Other[b]	**14**	**36**	**17**	**11**	**18**	**18**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	13	9	16	28	21	17
Deciduous Monocultures						
Monocultures Subtotal	**13**	**9**	**16**	**28**	**21**	**17**
Coniferous Mixed Forests	85	82	82	69	79	80
Deciduous Mixed Forests	2	9	2	3		3
Mixed Forests Subtotal	**87**	**91**	**84**	**72**	**79**	**83**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Nelson Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone				Nelson Region %
	ESSF %	ICH %	IDF %	MS %	
Bl Se	13	2			4
Cw Hw	2	14			5
Cw Se	1	2			1
Fdi		2	11	1	4
Fdi Lw		5	17	8	8
Fdi Pli		4	9	8	5
Fdi Py		1	15		5
Hw		2			1
Hw Cw	1	12			4
Lw Fdi		3	1	4	2
Lw Pli		3	5	8	4
Pli	13	7	8	25	11
Pli Bl	2	1			1
Pli Fdi	2	4	12	21	8
Pli Lw	3	9	11	13	8
Pli Se	12	5		4	5
Py Fdi			7		2
Se	3				1
Se Bl	31	3		1	8
Se Pli	3	1		1	1
Subtotal	**86**	**80**	**96**	**94**	**88**
Other[b]	**14**	**20**	**4**	**6**	**12**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	17	14	22	27	19
Deciduous Monocultures					
Monocultures Subtotal	**17**	**14**	**22**	**27**	**19**
Coniferous Mixed Forests	83	86	78	72	81
Deciduous Mixed Forests				1	
Mixed Forests Subtotal	**83**	**86**	**78**	**73**	**81**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Nelson Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone				Nelson Region %
	ESSF %	ICH %	IDF %	MS %	
Bl Pli	4	1		1	2
Bl Se	25	3	1	1	10
Cw Hw		4			2
Fdi		4	16	8	5
Fdi Lw		2	13	1	2
Fdi Pli	1	4	12	8	4
Fdi Py			13		2
Fdi Se	1	3	1	2	2
Hw Cw		4			2
Pli	8	3	4	21	7
Pli At		2	1	4	2
Pli Bl	5	1		3	3
Pli Fdi	2	6	5	7	5
Pli Lw	2	2	4	9	3
Pli Se	4	3	1	9	4
Se	13	8		2	8
Se Bl	20	4		2	8
Se Cw		3			1
Se Fdi	1	4		1	2
Se Pli	4	2	2	4	3
Subtotal	**90**	**63**	**73**	**83**	**77**
Other[b]	**10**	**37**	**27**	**17**	**23**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	23	16	24	32	22
Deciduous Monocultures					
Monocultures Subtotal	**23**	**16**	**24**	**32**	**22**
Coniferous Mixed Forests	77	81	74	65	76
Deciduous Mixed Forests		3	2	3	2
Mixed Forests Subtotal	**77**	**84**	**76**	**68**	**78**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Nelson Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone				Nelson Region %
	ESSF %	ICH %	IDF %	MS %	
Fdi	3	19	24	17	12
Fdi Pli		3	9	5	2
Fdi Se	1	1	2	4	1
Pli	12	9	19	29	14
Pli Fdi	1	2	7	13	3
Pli Lw		2	2	2	2
Pli Se	8	4	6	4	6
Se	64	33	12	11	42
Se Fdi	2	7		2	4
Se Pli	6	3	2	4	4
Subtotal	**97**	**83**	**83**	**91**	**90**
Other[b]	**3**	**17**	**17**	**9**	**10**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	80	65	65	58	70
Deciduous Monocultures					
Monocultures Subtotal	**80**	**65**	**65**	**58**	**70**
Coniferous Mixed Forests	20	35	35	42	30
Deciduous Mixed Forests					
Mixed Forests Subtotal	**20**	**35**	**35**	**42**	**30**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Nelson Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone				Nelson Region %
	ESSF %	ICH %	IDF %	MS %	
Bl	3				1
Bl Pli	5	1		1	2
Bl Se	33	5		2	14
Cw Fdi		3			1
Cw Hw		6			2
Fdi		3	18	10	6
Fdi Cw		4			1
Fdi Lw		2	13	2	3
Fdi Pli	1	4	12	8	5
Fdi Py			14		3
Fdi Se	1	4	1	2	2
Hw Cw		7			2
Lw Fdi		2	4	2	2
Lw Pli		2	2	2	1
Pli	9	3	3	20	8
Pli At		1	1	4	1
Pli Bl	6	2		3	3
Pli Fdi	2	6	5	5	5
Pli Lw	4	2	4	9	4
Pli Se	3	4	1	9	4
Py Fdi			10		2
Se	2	1		1	1
Se Bl	16	4		2	7
Se Fdi	1	3		1	1
Se Pli	3	1	1	3	2
Subtotal	**89**	**70**	**89**	**86**	**83**
Other[b]	**11**	**30**	**11**	**14**	**17**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	15	8	23	31	17
Deciduous Monocultures					
Monocultures Subtotal	**15**	**8**	**23**	**31**	**17**
Coniferous Mixed Forests	85	91	76	67	82
Deciduous Mixed Forests		1	1	2	1
Mixed Forests Subtotal	**85**	**92**	**77**	**69**	**83**
Total	**100**	**100**	**100**	**100**	**100**

[a,b] See previous page for footnotes.

Tree Species Composition of the Prince George Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone				Prince George Region %
	BWBS %	ESSF %	ICH %	SBS %	
At	20				8
At Ac	1				1
At Sw	9	1			3
Bl Sx		7	4	1	2
Cw Hw			18		
Pli	10	5		18	13
Pli At	2			1	1
Pli Fdi		1	7	2	1
Pli Sw	4				1
Pli Sx	2	13	8	28	17
Sw	21				8
Sw Ac	2				1
Sw At	6				4
Sw Bl					1
Sw Pli	5				2
Sx	5	2		8	6
Sx At	1			1	
Sx Bl	1	54	26	19	14
Sx Fdi		4	3	1	1
Sx Pli	7	9	2	18	12
Subtotal	**96**	**96**	**68**	**97**	**96**
Other[b]	**4**	**4**	**32**	**3**	**4**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	35	7	3	26	27
Deciduous Monocultures	22				8
Monocultures Subtotal	**57**	**7**	**3**	**26**	**35**
Coniferous Mixed Forests	33	91	97	73	61
Deciduous Mixed Forests	10	2		1	4
Mixed Forests Subtotal	**43**	**93**	**97**	**74**	**65**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince George Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone				Prince George Region %
	BWBS %	ESSF %	ICH %	SBS %	
At	10	1			2
At Pli	2	2		3	3
At Sw	8	1		1	2
At Sx	1			2	2
Bl Sx		8	2	1	1
Pli	4	6	1	16	11
Pli At	3			5	4
Pli Bl		1	1	2	2
Pli Sw	8	1		3	4
Pll Sx	5	2	1	9	8
Sw	20	8	1	3	7
Sw At	8			2	3
Sw Pli	8	3		2	3
Sx	1	35	22	17	14
Sx At		1	4	6	4
Sx Bl		17	18	8	8
Sx Ep			5	2	2
Sx Pli	2	3	5	7	6
Subtotal	**80**	**89**	**60**	**89**	**86**
Other[b]	**20**	**11**	**40**	**11**	**14**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	25	49	26	36	35
Deciduous Monocultures	10	1			2
Monocultures Subtotal	**35**	**50**	**26**	**36**	**37**
Coniferous Mixed Forests	46	47	68	55	53
Deciduous Mixed Forests	19	3	6	9	10
Mixed Forests Subtotal	**65**	**50**	**74**	**64**	**63**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince George Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone				Prince George Region %
	BWBS %	ESSF %	ICH %	SBS %	
Fdi			4		
Pli		4	2	13	10
Pli Fdi			1	1	1
Pli Sw	3	1		3	3
Pli Sx	1	5		9	7
Sw	76	13	7	8	18
Sw Pli	7	2	1	3	4
Sx	12	65	64	47	44
Sx Fdi		3	9	2	2
Sx Pli	1	6	8	12	10
Subtotal	**100**	**99**	**96**	**98**	**99**
Other[b]		**1**	**4**	**2**	**1**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	88	82	78	68	72
Deciduous Monocultures					
Monocultures Subtotal	**88**	**82**	**78**	**68**	**72**
Coniferous Mixed Forests	12	18	22	32	28
Deciduous Mixed Forests					
Mixed Forests Subtotal	**12**	**18**	**22**	**32**	**28**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince George Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone				Prince George Region %
	BWBS %	ESSF %	ICH %	SBS %	
At Ac	5				1
At Pli	2	2		4	3
At Sw	6				2
At Sx	1			1	1
Bl Sx	1	33	13	3	4
Pli	7	8		25	19
Pli At	8	1	1	11	10
Pli Bl		5	5	5	4
Pli Ep			1	1	1
Pli Fdi		9	3	1	1
Pli Se	10				3
Pli Sw	2	1		3	3
Pli Sx	14	2		18	16
Sw	5	4			2
Sw Ac	5				1
Sw At	8				2
Sw Bl		3		1	1
Sw Pli	7	2		1	3
Sx			1	2	1
Sx Bl	1	19	16	7	6
Sx Ep		1		1	1
Sx Pli	5	1		4	4
Subtotal	**87**	**91**	**40**	**88**	**89**
Other[b]	**13**	**9**	**60**	**12**	**11**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	12	13	1	28	23
Deciduous Monocultures					
Monocultures Subtotal	**12**	**13**	**1**	**28**	**23**
Coniferous Mixed Forests	72	86	93	63	67
Deciduous Mixed Forests	16	1	6	9	10
Mixed Forests Subtotal	**88**	**87**	**99**	**72**	**77**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince Rupert Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone					Prince Rupert Region %
	BWBS %	CWH %	ESSF %	ICH %	SBS %	
Bl				1		1
Bl Pli			15		1	1
Ba Sx			22	17		3
Bl Sx	1		20	3	3	3
Cw Hw		6				1
Hw		4		9		2
Hw Ba		51	7	12		5
Hw Bl				4		1
Hw Cw		18		3		2
Hw Pli				4		1
Hw Sx		2		7		1
Pli	4		2	8	15	12
Pli Bl			2		2	1
Pli Sx	1		1	5	50	37
Sw	78					1
Sx	12				2	2
Sx Bl			9	2	7	6
Sx Hw				6		1
Sx Pli			2	3	17	13
Subtotal	**96**	**81**	**80**	**84**	**97**	**94**
Other[b]	**4**	**19**	**20**	**16**	**2**	**6**
Total	**100**	**100**	**100**	**100**	**99**	**100**

Coniferous Monocultures	95	5	27	19	18	18
Deciduous Monocultures		2		1		1
Monocultures Subtotal	**95**	**7**	**27**	**20**	**18**	**19**
Coniferous Mixed Forests	5	90	73	78	81	80
Deciduous Mixed Forests		3		2	1	1
Mixed Forests Subtotal	**5**	**93**	**73**	**80**	**82**	**81**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince Rupert Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone					Prince Rupert Region %
	BWBS %	CWH %	ESSF %	ICH %	SBS %	
At Pli	1			1		1
Ba Hw		8				2
Bl Sx				2		1
Hw		4		1		1
Hw Ba		41		1		7
Hw Cw		4		1		1
Hw Pli		2		2		1
Hw Ss		4				1
Hw Sx		8		6		3
Pli	82		29	6	30	21
Pli At				2	4	3
Pli Bl	8		1	1	4	4
Pli Hw				2		1
Pli Sx	4		11	14	33	20
Ss		4				1
Ss Hw		5				1
Sx		1	34	11	7	7
Sx At				2		1
Sx Bl			9	3		3
Sx Hw		4	2	6		2
Sx Pli	5		7	9	10	7
Subtotal	**100**	**85**	**93**	**70**	**88**	**89**
Other[b]		**15**	**7**	**30**	**12**	**11**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	83	9	65	21	38	31
Deciduous Monocultures		1				
Monocultures Subtotal	**83**	**10**	**65**	**21**	**38**	**31**
Coniferous Mixed Forests	16	88	35	70	60	65
Deciduous Mixed Forests	1	2		9	2	4
Mixed Forests Subtotal	**17**	**90**	**35**	**79**	**62**	**69**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince Rupert Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone					Prince Rupert Region
	BWBS %	CWH %	ESSF %	ICH %	SBS %	%
Hw Sx		9		1		1
Pli	26	1	18	11	29	22
Pli Sw	13					1
Pli Sx	11	1	18	19	35	28
Ss		24				2
Ss Cw		14				1
Sw	1			1	1	1
Sw Pli					1	1
Sx	49	21	32	26	17	20
Sx Hw		3		2		1
Sx Pli		1	24	17	16	15
Subtotal	**100**	**74**	**92**	**77**	**99**	**93**
Other[b]	**0**	**26**	**8**	**23**	**1**	**7**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	76	52	53	43	47	46
Deciduous Monocultures		1				
Monocultures Subtotal	**76**	**53**	**53**	**43**	**47**	**46**
Coniferous Mixed Forests	24	46	47	57	53	54
Deciduous Mixed Forests		1				
Mixed Forests Subtotal	**24**	**47**	**47**	**57**	**53**	**54**
Total	**100**	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Prince Rupert Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone				Prince Rupert Region %
	BWBS %	CWH %	ICH %	SBS %	
At Pli	3			1	1
Ba Hw		12			5
Bl Pli				2	1
Cw Hw		1			1
Hw		6	3		3
Hw Ba		55	5		26
Hw Bl			8		1
Hw Cw		4	4		2
Hw Pli		1	9		1
Hw Ss		5			2
Hw Sx		6	14		4
Pli	84		1	25	22
Pli At			3	4	1
Pli Bl	9		3	12	5
Pli Sx	3		5	40	12
Ss Hw		2			1
Sx Bl			1	1	1
Sx Hw		2	6		1
Sx Pli	1		2	7	2
Subtotal	**100**	**94**	**64**	**92**	**92**
Other[b]		**6**	**36**	**8**	**8**
Total	**100**	**100**	**100**	**100**	**100**

Coniferous Monocultures	84	7	6	26	25
Deciduous Monocultures					
Monocultures Subtotal	**84**	**7**	**6**	**26**	**25**
Coniferous Mixed Forests	16	92	83	74	74
Deciduous Mixed Forests		1	11		1
Mixed Forests Subtotal	**16**	**93**	**94**	**74**	**75**
Total	**100**	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Vancouver Forest Region

Before harvest

Species Type[a]	Biogeoclimatic Zone			Vancouver Region %
	CDF %	CWH %	MH %	
Ba Hw		8	36	8
Cw		1		1
Cw Fdc		1		1
Cw Hw		20		19
Cw Yc		2		2
Fdc	22	3	1	3
Fdc Cw	11	4		4
Fdc Hw	34	7		7
Hw		1	1	1
Hw Ba		25	46	26
Hw Cw	3	11	3	10
Hw Fdc	9	4		4
Hw Ss	2	4		4
Hw Yc		1	6	1
Ss Hw		2		2
Subtotal	**81**	**94**	**93**	**93**
Other[b]	**19**	**6**	**7**	**7**
Total	**100**	**100**	**100**	**100**

Coniferous Monocultures	22	5	4	6
Deciduous Monocultures				
Monocultures Subtotal	**22**	**5**	**4**	**6**
Coniferous Mixed Forests	72	94	96	93
Deciduous Mixed Forests	5	1		1
Mixed Forests Subtotal	**77**	**95**	**96**	**94**
Total	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Vancouver Forest Region

At the free-growing stage

Species Type[a]	Biogeoclimatic Zone			Vancouver Region %
	CDF %	CWH %	MH %	
Ba Cw		1	1	1
Ba Hm		1	17	1
Ba Hw		10	23	10
Ba Se		1	9	1
Ba Yc		1	10	2
Cw Fdc	5	1		1
Cw Hw		6		5
Fdc	17	4	1	5
Fdc Ba		1	1	1
Fdc Cw	23	7	1	7
Fdc Hw	18	8		8
Fdc Plc	6			1
Fdc Se		1		1
Hw		2	1	2
Hw Ba		14	3	12
Hw Cw	1	15	1	15
Hw Fdc	3	7	2	6
Hw Ss		4		4
Se		1	5	1
Se Ba		1	5	1
Se Plc				1
Ss Hw		2		2
Subtotal	**73**	**88**	**80**	**88**
Other[b]	**27**	**12**	**20**	**12**
Total	**100**	**100**	**100**	**100**

Coniferous Monocultures	18	9	13	10
Deciduous Monocultures				
Monocultures Subtotal	**18**	**9**	**13**	**10**
Coniferous Mixed Forests	80	90	85	89
Deciduous Mixed Forests	2	1	2	1
Mixed Forests Subtotal	**82**	**91**	**87**	**90**
Total	**100**	**100**	**100**	**100**

[a,b] See previous page for footnotes.

Tree Species Composition of the Vancouver Forest Region

At planting

Species Type[a]	Biogeoclimatic Zone			Vancouver Region %
	CDF %	CWH %	MH %	
Ba		1	8	1
Ba Cw		2		2
Cw		3		2
Cw Hw		2	1	2
Fdc	34	31	9	31
Fdc Ba		2		2
Fdc Cw	33	11		11
Fdc Hw		3	1	2
Fdc Se		2		2
Fdc Ss		2		2
Hw		4	6	4
Hw Ba		2	1	2
Hw Cw		3		2
Se		5	48	8
Ss		8		7
Ss Cw		2		2
Subtotal	**67**	**83**	**74**	**82**
Other[b]	**33**	**17**	**26**	**18**
Total	**100**	**100**	**100**	**100**

Coniferous Monocultures	37	53	75	54
Deciduous Monocultures				
Monocultures Subtotal	**37**	**53**	**75**	**54**
Coniferous Mixed Forests	63	47	25	46
Deciduous Mixed Forests				
Mixed Forests Subtotal	**63**	**47**	**25**	**46**
Total	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Tree Species Composition of the Vancouver Forest Region

After natural regeneration

Species Type[a]	Biogeoclimatic Zone			Vancouver Region %
	CDF %	CWH %	MH %	
Ba		1	7	1
Ba Cw		1		1
Ba Hm		2	26	3
Ba Hw		17	35	17
Ba Yc		2	13	3
Cw Fdc	6	1		1
Cw Hw	1	6		5
Dr Hw		1		1
Fdc	17	2		2
Fdc Cw	21	3	2	3
Fdc Hw	29	5		6
Hw		3		2
Hw Ba		20	4	19
Hw Cw	4	20	1	19
Hw Dr		1		1
Hw Fdc	3	5	1	4
Hw Ss		4		4
Ss Hw		1		1
Subtotal	**81**	**95**	**89**	**93**
Other[b]	**19**	**5**	**11**	**7**
Total	**100**	**100**	**100**	**100**

Coniferous Monocultures	17	5	8	6
Deciduous Monocultures				
Monocultures Subtotal	**17**	**5**	**8**	**6**
Coniferous Mixed Forests	79	94	92	93
Deciduous Mixed Forests	4	1		1
Mixed Forests Subtotal	**83**	**95**	**92**	**94**
Total	**100**	**100**	**100**	**100**

[a] These species and species combinations are those that dominate the forest land. For each species type, the first species is the most predominant and the second species is the second most observed species on site. See Appendix 1 for a full description of tree species codes.

[b] Includes a wide variety of other tree species combinations. The list is too comprehensive to be presented here.

Appendix 1 – Tree Species and Biogeoclimatic Zone Codes

Tree species codes

Code	Species
Ac	Cottonwood/Poplar
At	Trembling aspen
Ba	Amabilis fir
Bl	Subalpine fir
Cw	Western redcedar
Dr	Red alder
Ep	Common paper birch
Fdc	Douglas-fir – Coast
Fdi	Douglas-fir – Interior
Hm	Mountain hemlock
Hw	Western hemlock
Lw	Western larch
Plc	Lodgepole pine – Coast
Pli	Lodgepole pine – Interior
Py	Yellow pine
Se	Engelmann spruce
Ss	Sitka spruce
Sw	White spruce
Sx	Hybrid spruce
Yc	Yellow-cedar

Biogeoclimatic zone codes

Code	Biogeoclimatic zone
BWBS	Boreal White and Black Spruce
CDF	Coastal Douglas-fir
CWH	Coastal Western Hemlock
ESSF	Engelmann Spruce-Subalpine Fir
ICH	Interior Cedar-Hemlock
IDF	Interior Douglas-fir
MH	Mountain Hemlock
MS	Montane Spruce
PP	Ponderosa Pine
SBS	Sub-Boreal Spruce